

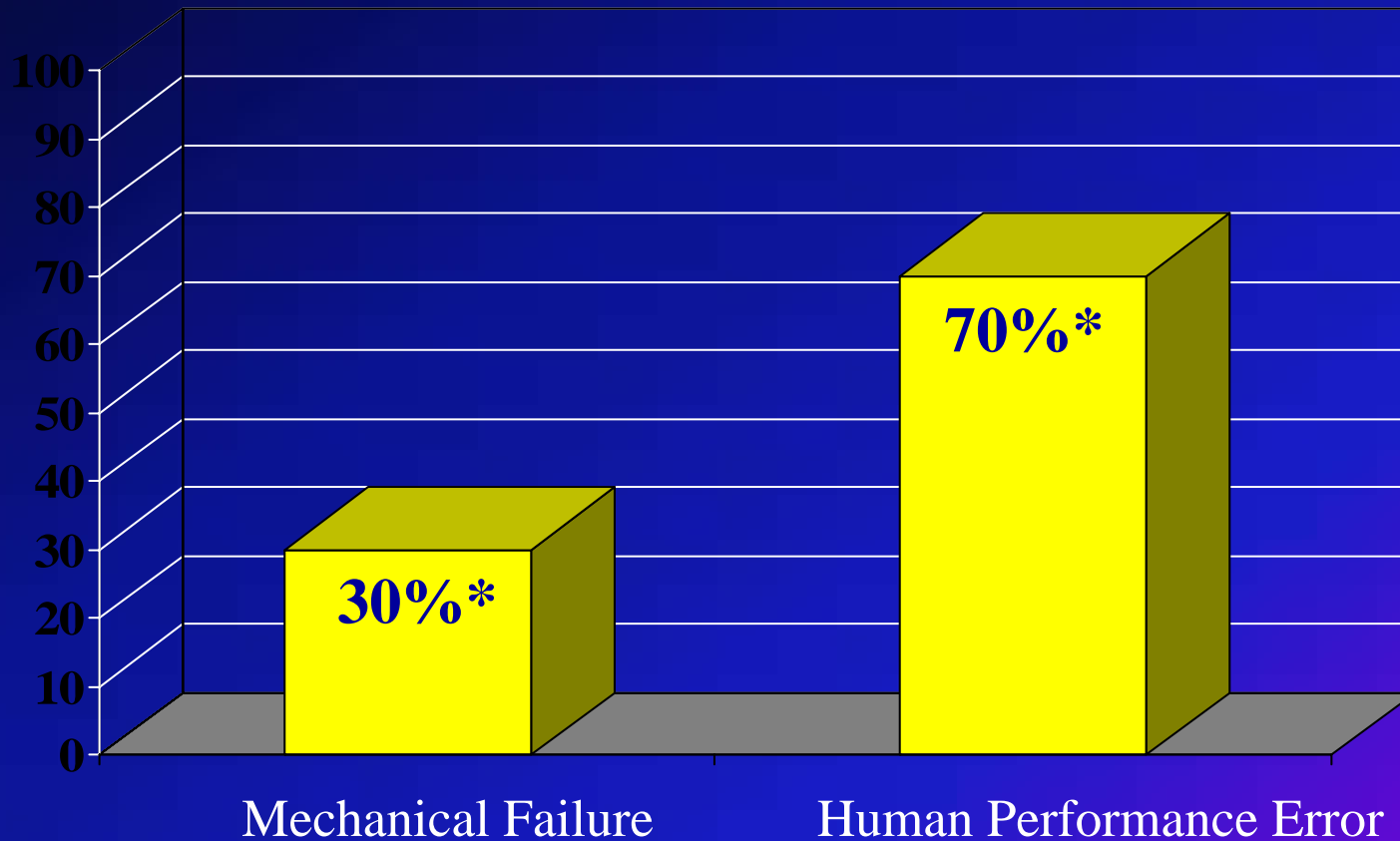
A composite image showing the Space Shuttle Columbia on the right, ascending vertically with a large plume of white smoke and fire at its base. To the left of the shuttle, the International Space Station (ISS) is shown in orbit, with its complex structure of white modules and large solar panel arrays. The background is a deep blue sky with scattered white clouds. In the bottom left corner, the curved horizon of the Earth is visible, showing a mix of green land and blue oceans under a thin layer of white clouds.

Turning Experts into Expert Teams

**Project Management Challenge 2006
Third Annual NASA PM Conference**

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Where is NASA's greatest threat?



* (NASA/FAA CRM Workshop and Conference, 1981)
(Industry baseline for high risk/high reliability organizations)

Space Flight Resource Management Training

- First developed and formally trained for Shuttle Flight Crews and Shuttle Flight Controllers in 1997
- How does Crew Resource Management (CRM) and SFRM differ?

Mission Management Team (MMT) SFRM

- Shuttle Program Management buy-in and support
- Team-Centered Debriefings to facilitate sustained team improvement with MMT Chair assuring accountability
- Instruction customized for the NASA MMT membership

SFRM Definition

Space Flight Resource Management (SFRM) is the exercise of **behaviors/skills** designed to improve the ability of individuals and teams to minimize the occurrence and negative consequences of **human performance errors**.

Human Performance Error Risk Management

Avoidance → Develop strong habit patterns

Containment → Identify and correct real-time

Mitigation → Take action to lessen the severity

←Time to make Decisions →

Program
Decisions

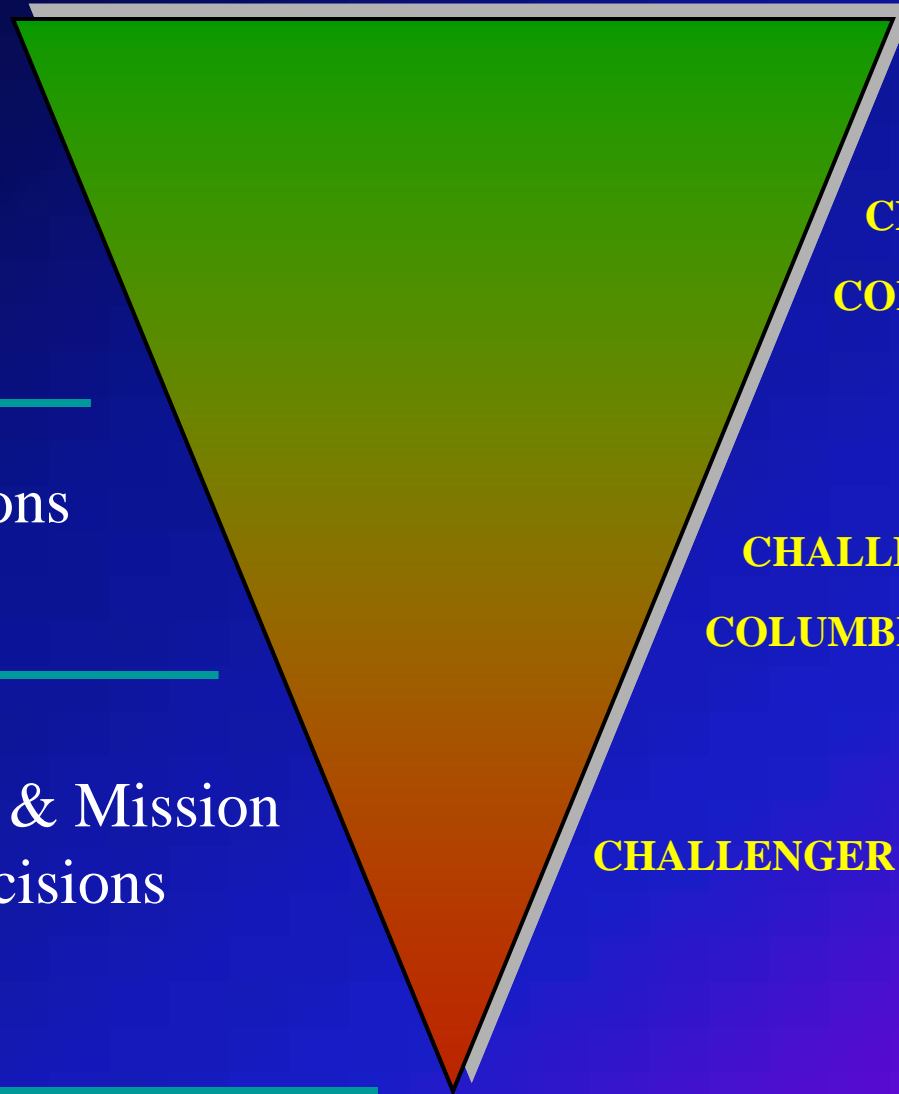
**CHALLENGER
COLUMBIA**

Flight Decisions

**CHALLENGER
COLUMBIA**

Launch & Mission
Decisions

CHALLENGER



Structure of SFRM Performance Elements

Critical Element

Core Elements

Foundation Elements



Command

Command is the exercise of **authority** to ensure that team/mission objectives are successfully completed.

- Program/project Manager's Authority
- Team Member Authority
- Responsibility
- Accountability
- Team Coordination

Leadership

The exercise of behaviors/skills by leaders and team members to ensure team/mission objectives are completed in a safe, efficient and effective manner.

- Team Climate
- Mentoring
- Professionalism
- Conflict Resolution

Communication

The process of exchanging information, ideas, and thoughts in an accurate and timely manner that includes an assurance that the message is clearly received and understood.

- Effective Team Communication
- Inquiry
- Advocacy
- Removing Barriers to Effective Communication

Communication

Intuition is an internal indication that something is not correct, not understood or an assertion based upon expertise.

What value does it have in the communication process?

Intuition is our cue to **take action** and **inquire**

- Seek more information or data
- Validate assertions

What is our “best engineering judgment” based upon?

Communication

Signals of Intuition

Fear

Perception of consequences

Apprehension

Incomplete analysis

Suspicion

What is the data saying?

Hesitation

Assumptions, data pedigree

Doubt

Critical thinking

Hunches/Gut Feeling

Based on expertise

Curiosity

Looking beyond the obvious

Workload Management

The process of evenly distributing activities by planning, prioritizing, and assigning tasks to individual team members.

- Planning and Prioritizing
- Overload Recognition
- Task Assignment

Situational Awareness

Continuous ability of the **team** acting as a single entity to accurately perceive the relationship of themselves and their surroundings. Forecasting and executing tasks must be based on that perception.

- **Monitor and Anticipate**
- **Recognition of Indications of Low Situational Awareness**

Indications of Low Situational Awareness

- Target projections/milestones not being met
- Inappropriate procedures/processes
- Distractions/Losing focus
- Poor communication
- Unresolved problems/conflicts
- Complacency
- Having an “uneasy” feeling

Situational Awareness

Regaining Team Situational Awareness

- Examine the presence and quality of core elements

Core Elements



Decision Making

Process of determining and implementing the best course of action and evaluating the outcome.

- Decision Making Type
- Problem Identification
- Decision Making Process
 - Experience Based Decision Making
 - Traditional Method Decision Making
- Evaluate the outcome

Why Debrief & Self-Critique?

- Experience does NOT immediately transfer to Expertise
- Debriefing and Self-Critique become the means to turn experts into expert TEAMS
- Facilitates continued organizational/team improvement
- Proactively replaces the “refresher” training mindset

Barriers to Effective Debriefs

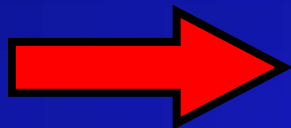
- Fear of retribution and or embarrassment
- Personalities/Egos/Protecting ones own “turf”
- Too tired
- Too complicated, no goals, no structure
- Shallow - Focus only on outcomes and glossing over the process
- Over reliance on external expert observations

Effective Debrief Characteristics

- Establishes expectations
- Focus on individual and team accountability
- Team-centered
- Strives for self-discovery
- Develops a specific action plan
- Identifies and reinforces the positive

Team-Centered Debriefing Objectives

- Team members discuss issues directly with each other
- Team members analyze the observed behaviors/skills
 - Effect upon the outcome of the decision
 - Effect upon the decision-making process
- Team members discover WHAT happened and WHY
- Team transfers the lessons to lessons learned
 - Develops a corrective action plan
 - Reinforces positive behaviors/skills
- Team demonstrates their commitment and understanding of the value of the debrief process



Develop self-critiquing habits

Summary

- Our most serious hazard resides within ourselves
- SFRM Performance Elements and related behaviors/skills
- SFRM connections to project...and beyond
- Responsibility to transfer lessons to lessons learned
 - Team-debriefing and Self-critiques is how we get there
- Articulate expectations to all project members
- Anyone can part of a team of experts...

IT TAKES EFFORT TO BECOME AN EXPERT TEAM

Questions:

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